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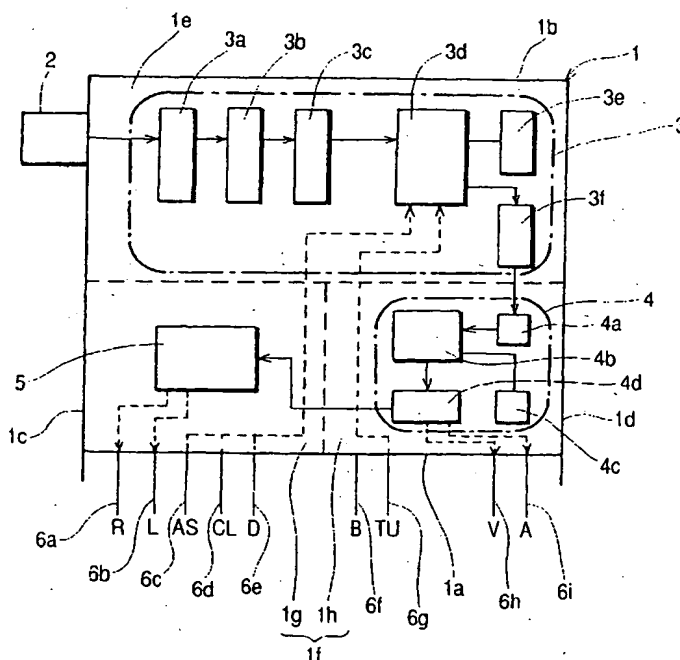
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(54) **Television tuner unit**

(57) A first side (1a) of a metal frame (1) is provided with plural terminals that are respectively connected to a tuner (3), a video intermediate frequency circuit part (4), and a stereo demodulator (5). A tuner is disposed in a first partitioned region (1e) of a second side of two partitioned regions, the two partitioned regions dividing the inside of the metal frame into a first side and the

second side opposite thereto, a connector (2) for inputting a television signal is attached in a position corresponding to the first partitioned region on a third side adjacent to the first side and the second side, and a stereo demodulator and a video intermediate frequency circuit part are disposed in a second partitioned region of the first side of the two partitioned regions.

FIG. 1



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a television tuner unit having: a tuner for frequency-converting a received television signal into an intermediate frequency signal; a video intermediate frequency circuit part for detecting the intermediate frequency signal and outputting a video signal and a sound signal; and a stereo demodulator for demodulating a composite signal outputted from the video intermediate frequency circuit part and outputting a stereo sound signal.

2. Description of the Prior Art

[0002] FIG. 2 is a plan view showing a circuit layout of a conventional television tuner unit (hereinafter simply referred to as a tuner unit). A rectangular metal frame 11 has opposite long sides, a first side 11a and a second side 11b, and opposite short sides, a third side 11c and a fourth side 11d. A connector 12 through which television signals are inputted is attached to the third side 11c. The metal frame 11 is partitioned to first to third regions 11e, 11f, and 11g in this order from the third side 11c toward the fourth side 11d. In the regions 11e, 11f, and 11g, wiring boards (not shown) for forming circuits are respectively mounted.

[0003] In the first region 11e, a tuner 13 is formed which frequency-converts a received television signal into an intermediate frequency signal. The tuner 13 has an antenna tuning circuit 13a, a high-frequency amplifier circuit 13b, an interstage tuning circuit 13c, a composite IC (integrated circuit) 13d, a resonance circuit 13e, and an intermediate frequency tuning circuit 13f, and the like. The high-frequency amplifier circuit 13b is configured with a variable gain amplifier, and the composite IC 13d is configured with a mixer transistor, an oscillator transistor, a PLL circuit for selecting channels, and the like (not shown). The resonance circuit 13e is coupled to the oscillator transistor within the composite IC 13d to make up an oscillator.

[0004] In the second region 11f, a video intermediate frequency circuit part 14 is formed which detects an intermediate frequency signal and outputs a composite signal of a video signal, a sound signal, and stereo, and generates an AGC voltage. The video intermediate frequency circuit part 14 has a SAW filter 14a, a video intermediate frequency IC 14b including a video detector and an intermediate frequency amplifier (not shown), a voltage control oscillator 14c, a trap circuit 14d, and the like. The voltage control oscillator 14 is used to detect video.

[0005] In the third region 11g, a stereo demodulator 15 is formed which outputs a stereo sound signal from a composite signal outputted from the video intermedi-

ate frequency circuit part 14. A major portion of the stereo demodulator 15 is configured with integrated circuits.

[0006] The first side 11a is provided with plural terminals 16 that are respectively connected to the tuner 13, the video intermediate frequency circuit part 14, and the stereo demodulator 15. When the tuner unit is mounted on a mother board (not shown) on which television set main circuits are formed, the terminals 16 are inserted in the mother board and connected to the circuits.

[0007] The first side 11a corresponding to the first region 11e is provided with terminals related to the operation of the tuner 13 such as an AGC voltage input terminal (AGC) 16a, a PLL circuit address terminal (AS) 16b, a clock terminal (CL) 16c, a data terminal (DA) 16d, a power terminal (B) 16e, a tuning voltage source terminal (TU) 16f, and the like.

[0008] The AGC terminal 16a is connected to the high-frequency amplifier circuit 13b; the address terminal 16b, clock terminal 16c, and data terminal 16d are connected to the composite IC 13d; the power terminal 16e is connected to the high-frequency amplifier circuit 13b and the composite IC 13d; and the tuning voltage source terminal 16f is connected to the composite IC 13d.

[0009] The first side 11a corresponding to the second region 11f is provided with terminals related to the operation of the video intermediate frequency circuit part 14 such as a power terminal (B) 16g, an AGC voltage output terminal (AGC) 16h, a video signal terminal (V) 16i, a sound signal terminal (A) 16j, and the like. The power terminal 16g and the AGC voltage output terminal 16h are connected to the video intermediate frequency IC 14b, and the video signal terminal 16i and the sound signal terminal 16j are connected to the trap circuit 14d.

[0010] The first side 11a corresponding to the third region 11g is provided with a power terminal (B) 16k, a right sound signal terminal (R) 16l, and a left sound signal terminal (L) 16m that are connected to the stereo demodulator 15.

[0011] From a power supply part of the television set body, a power supply voltage is applied to the three power terminals 16e, 16g, and 16k through which it is supplied to corresponding circuits. This prevents a power supply line within the tuner unit from becoming long. Also to the tuning voltage source terminal 16f, a voltage (30 V) is supplied from the power supply part of the television set body. This voltage serves as a voltage source for generating a tuning voltage for selecting a channel, and the tuning voltage is set based on a signal related to channel selection, inputted to the address terminal 16b, clock terminal 16c, and data terminal 16d. The set tuning voltage is supplied to the antenna tuning circuit 13a and the interstage tuning circuit 13c.

[0012] A video signal and a sound signal of a selected channel are outputted to the video signal terminal 16i and the sound signal terminal 16j, respectively. For stereo broadcasting, a stereo sound signal is outputted to the right sound signal terminal (R) 16l and the left sound

signal terminal (L) 16m. An AGC voltage outputted to the AGC voltage output terminal 16h is inputted to the AGC voltage input terminal 16a again via the mother board and supplied to the high-frequency amplifier circuit 13b.

[0013] With the structure of conventional tuner units, circuits (tuner, video intermediate frequency circuit part, and stereo demodulator) are disposed in the horizontally extending region, the first region to third region, increasing a mounting area on a mother board of the television set body. Also, the three power terminals are provided because of the long disposition of the circuits, increasing the number of terminals. Moreover, the two AGC terminals are provided to supply an AGC voltage generated in the video intermediate frequency circuit part to the high-frequency amplifier, increasing the number of terminals.

SUMMARY OF THE INVENTION

[0014] An object of the present invention is to provide a television tuner unit that has a smaller area to mount on a mother board of a television set body and fewer terminals for connecting with the mother board.

[0015] To achieve the above object, there is provided a television tuner unit including: a tuner for frequency-converting a received television signal into an intermediate frequency signal; a video intermediate frequency circuit part for detecting the intermediate frequency signal and outputting a video signal and a sound signal; a stereo demodulator for demodulating a composite signal outputted from the video intermediate frequency circuit part and outputting a stereo sound signal; and a metal frame having four sides and storing the tuner, the video intermediate frequency circuit part, and the stereo demodulator therein, wherein a first side of the metal frame is provided with plural terminals that are respectively connected to the tuner, the video intermediate frequency circuit part, and the stereo demodulator, the tuner is disposed in a first partitioned region of a second side of two partitioned regions, the two partitioned regions dividing the inside of the metal frame into a first side and the second side opposite thereto, a connector for inputting the television signal is attached in a position corresponding to the first partitioned region on a third side adjacent to the first side and the second side, and the stereo demodulator and the video intermediate frequency circuit part are disposed in a second partitioned region of the first side of the two partitioned regions.

[0016] Preferably, the stereo demodulator is disposed in a first region of the third side in the second partitioned region, and the video intermediate frequency circuit part is disposed in a second region of a fourth side in the first partitioned region.

[0017] Preferably, one of the plural terminals is a power terminal through which a power supply voltage is supplied from the outside, and the power supply voltage is supplied from the power terminal to the tuner, the video

intermediate frequency circuit part, and the stereo demodulator.

[0018] Preferably, the video intermediate frequency circuit part outputs an AGC voltage, the tuner is provided with a variable gain amplifier, and the AGC voltage is inputted to the variable gain amplifier within the metal frame.

[0019] Preferably, a stereo sound terminal for outputting the stereo sound signal is provided at the first side corresponding to the first region, and a video terminal for outputting the video signal and a sound terminal for outputting the sound signal are provided at the first side corresponding to the second region.

[0020] Preferred embodiments of the present invention will be described in detail based on the followings, wherein:

FIG. 1 is a plan view showing a circuit layout of the television tuner unit of the present invention; and FIG. 2 is a plan view showing a circuit layout of a conventional television tuner unit.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] FIG. 1 is a plan view showing a circuit layout of a television tuner unit (hereinafter simply referred to as a tuner unit) of the present invention. A rectangular metal frame 1 has one pair of opposite sides, a first side 1a and a second side 1b, and another pair of opposite sides, a third side 1c and a fourth side 1d. A connector 2 through which television signals are inputted is attached at the third side 1c. A wiring board (not shown) for forming circuits is stored within the metal frame 1. The inside of the metal frame 1 is halved to a first partitioned region 1e at the second side 1b and a second partitioned region 1f at the first side 1a opposite to the second side 1a, and the second partitioned region 1f is halved to a first region 1g at the third side 1c and a second region 1h at the fourth side 1d.

[0022] A tuner 3 for frequency-converting a received television signal into an intermediate signal is formed on a wiring board in the first partitioned region 1e. The tuner 3 has an antenna tuning circuit 3a, a high-frequency amplifier circuit 3b, an interstage tuning circuit 3c, a composite IC (integrated circuit) 3d, a resonance circuit 3e, and an intermediate frequency tuning circuit 3f, and the like. The high-frequency amplifier circuit 3b is configured with a variable gain amplifier, and the composite IC 3d is configured with a mixer transistor, an oscillator transistor, a PLL circuit for selecting channels, and the like. The resonance circuit 3e is coupled to the oscillator transistor within the composite IC 3d to make up an oscillator.

[0023] In the second region 1h in the second region 1f, a video intermediate frequency circuit part 4 is formed which detects an intermediate frequency signal and outputs a composite signal of a video signal, a

sound signal, and stereo, and generates an AGC voltage. The video intermediate frequency circuit part 4 has a SAW filter 4a, a video intermediate frequency IC 4b including a video detector and an intermediate frequency amplifier (not shown), a voltage control oscillator 4c, a trap circuit 4d, and the like. The voltage control oscillator 4c is coupled to a video detector within the video intermediate frequency circuit part 4.

[0024] In the first region 1g in the second partitioned region 1f, a stereo demodulator 5 is formed which outputs a stereo sound signal from a composite signal outputted from the video intermediate frequency circuit part 4. The major portion of the stereo demodulator 5 is configured with integrated circuits.

[0025] The first side 1a is provided with plural terminals 6 that are respectively connected to the tuner 3, the video intermediate frequency circuit part 4, and the stereo demodulator 5. When the tuner unit is mounted on a mother board (not shown) on which television set main circuits are formed, the terminals 6 are inserted in the mother board and connected to the circuits on the mother board.

[0026] The first side 1a corresponding to the first region 1g is provided with a right sound signal terminal (R) 6a and a left sound signal terminal (L) 6b that are connected to the stereo demodulator 5, and an address terminal (AS) 6c for PLL circuits related to the operation of the tuner, a clock terminal (CL) 6d, a data terminal (DA) 6e, and the like.

[0027] The first side 1a corresponding to the second area 1h is provided with a power terminal (B) 6f, a tuning voltage source terminal (TU) 6g related to the operation of the tuner 3, a video signal terminal (V) 6h related to the operation of the video intermediate frequency circuit part 4, a sound signal terminal (A) 6i, and the like. Of the above terminals, the power terminal 6f and the tuning voltage source terminal 6g may be provided at the first side 1a corresponding to the first region 1g.

[0028] The address terminal 6c, the clock terminal 6d, and the data terminal 6e are connected to the composite IC 3d, and the power terminal 6f is connected to the high-frequency amplifier circuit 3b, the composite IC 3d, the video intermediate frequency IC 4b, and the stereo demodulator 5. The tuning voltage source terminal 6g is connected to the composite IC 3d. The video signal terminal 6h and the sound signal terminal 6i are connected to the trap circuit 4d.

[0029] A cover (not shown) covering the partitioned regions 1e and 1f of the metal frame 1 is installed in the metal frame 1 and electromagnetically shielded.

[0030] From a power supply part of the television set body, a power supply voltage (5 V) is applied to the power terminal 6f through which it is supplied to the high-frequency amplifier circuit 3b, the composite IC 3d, the video intermediate frequency IC 4b, and the stereo demodulator 5. Also to the tuning voltage source terminal 6g, a voltage (30 V) is supplied from the power supply part of the television set body. This voltage serves as a

voltage source for generating a tuning voltage for selecting a channel, and the tuning voltage is set based on a signal related to channel selection, inputted to the address terminal 6c, clock terminal 6d, and data terminal 6e. The set tuning voltage is supplied to the antenna tuning circuit 3a, the interstage tuning circuit 3c, the resonance circuit 3e, and the like.

[0031] In the above configuration, a television signal inputted from the connector 2 is frequency-converted into an intermediate signal by the tuner 3 disposed in the first partitioned region 1e, and the intermediate signal is processed by the video intermediate frequency circuit part 4 disposed in the second region 1h to output a video signal, a sound signal, a composite signal and an AGC voltage. The video signal and the sound signal are outputted to the video signal terminal 6h and the sound signal terminal 6i, respectively. The outputted AGC voltage is supplied to the high-frequency amplifier circuit 3b through a wiring board. For stereo broadcasting, the composite signal is demodulated by the stereo demodulator 5 disposed in the first region to output a stereo sound signal to the right sound signal terminal (R) 6a and the left sound signal terminal (L) 6b.

[0032] Since the first partitioned region 1e in which the tuner 3 is disposed faces the second partitioned region 1f including the second region 1h in which the video intermediate frequency circuit part 4 is disposed, and the first region 1g in which the stereo demodulator 5 is disposed, signals processed in the circuit parts flow within the metal frame in the shape of the letter U as shown by the arrow in the drawing, and no interference occurs among the circuit parts. Since the first side 1a at which the terminals 6 are provided is shortened for the reason described above, a mounting area on the mother board is reduced. Also, the shortened first side 1a reduces distances between the circuit parts, one power terminal suffices for the supply of a power supply voltage, and the AGC terminals can be cut, so that the number of all terminals is reduced.

[0033] As has been described above, according to the present invention, the first side of the metal frame is provided with the plural terminals that are respectively connected to the tuner, the video intermediate frequency circuit part, and the stereo demodulator, the tuner is disposed in the first partitioned region of the second side of the two partitioned regions, the two partitioned regions dividing the inside of the metal frame into the first side and the second side opposite thereto, the connector for inputting the television signal is attached in the position corresponding to the first partitioned region on the third side adjacent to the first side and the second side, and the stereo demodulator and the video intermediate frequency circuit part are disposed in the second partitioned region of the first side of the two partitioned regions. With this construction, the first side at which the terminals are provided is shortened, so that a mounting area on the mother board of the television set body is reduced.

[0034] The stereo demodulator is disposed in the first region of the third side in the second partitioned region and the video intermediate frequency circuit part is disposed in the second region of the fourth side in the first partitioned region. With this construction, signals processed in the circuit parts flow within the metal frame in the shape of the letter U, and no interference occurs among the circuit parts.

[0035] One of the plural power terminals is a power terminal to which a power supply voltage is supplied from the outside, and from the power terminal, the power supply voltage is supplied to the video intermediate frequency circuit part and the stereo demodulator. With this construction, the number of required power terminals is no more than one, contributing to reduction in the number of terminals.

[0036] The video intermediate frequency circuit part outputs an AGC voltage, the tuner is provided with the variable gain amplifier, and the AGC voltage is inputted to the variable gain amplifier. With this construction, an AGC voltage terminal does not need to be provided, contributing to reduction in the number of terminals.

[0037] Of the plural terminals, a stereo sound terminal for outputting the stereo sound signal is provided at the first side corresponding to the first region, and a video terminal for outputting the video signal and a sound terminal for outputting the sound signal are provided at the first side corresponding to the second region. With this construction, the stereo sound signal, video signal, and sound signal can be outputted at a minimum distance.

Claims

1. A television tuner unit comprising:

a tuner for frequency-converting a received television signal into an intermediate frequency signal;

a video intermediate frequency circuit part for detecting the intermediate frequency signal and outputting a video signal and a sound signal;

a stereo demodulator for demodulating a composite signal outputted from the video intermediate frequency circuit part and outputting a stereo sound signal; and

a metal frame having four sides and storing the tuner, the video intermediate frequency circuit part, and the stereo demodulator therein,

wherein a first side of the metal frame is provided with plural terminals that are respectively connected to the tuner, the video intermediate frequency circuit part, and the stereo demodulator, wherein the tuner is disposed in a first partitioned region of a second side of two partitioned regions, the two partitioned regions dividing the inside of the metal

frame into a first side and the second side opposite thereto, wherein a connector for inputting the television signal is attached in a position corresponding to the first partitioned region on a third side adjacent to the first side and the second side, and wherein the stereo demodulator and the video intermediate frequency circuit part are disposed in a second partitioned region of the first side of the two partitioned regions.

2. The television tuner unit according to claim 1, wherein the stereo demodulator is disposed in a first region of the third side in the second partitioned region, and wherein the video intermediate frequency circuit part is disposed in a second region of a fourth side in the first partitioned region.

3. The television tuner unit according to claim 1, wherein one of the plural terminals is a power terminal through which a power supply voltage is supplied from the outside, and wherein the power supply voltage is supplied from the power terminal to the tuner, the video intermediate frequency circuit part, and the stereo demodulator.

4. The television tuner unit according to claim 1, wherein the video intermediate frequency circuit part outputs an AGC voltage, wherein the tuner is provided with a variable gain amplifier, and wherein the AGC voltage is inputted to the variable gain amplifier within the metal frame.

5. The television tuner unit according to claim 2, wherein, of the plural terminals, a stereo sound terminal for outputting the stereo sound signal is provided at the first side corresponding to the first region, and wherein a video terminal for outputting the video signal and a sound terminal for outputting the sound signal are provided at the first side corresponding to the second region.

FIG. 1

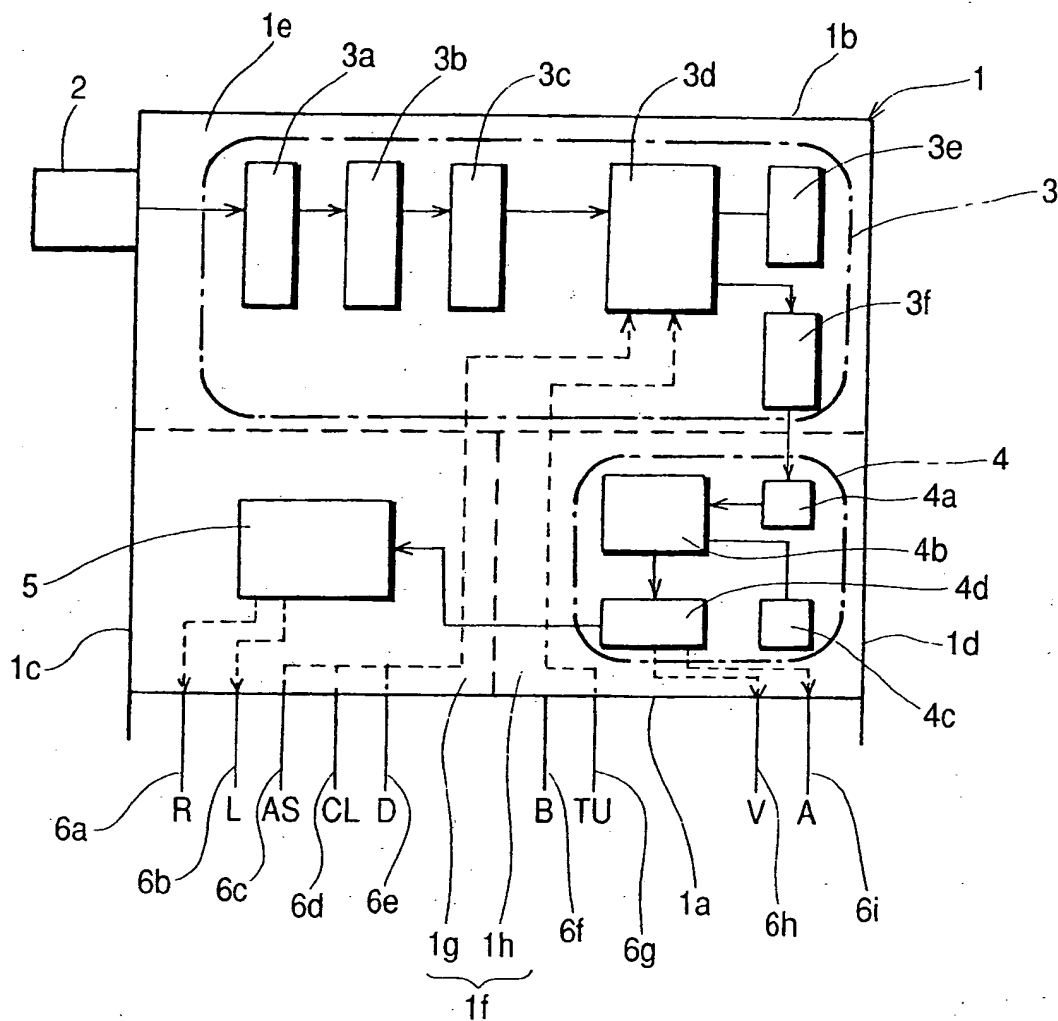


FIG. 2
PRIOR ART

